Marshall Star, December 19, 2012 Edition

# MARSHALL STAR

In This Week's Star



## Marshall Center Exceeds 2012 CFC Goal!

*By Megan Davidson*

NASA's Marshall Space Flight Center once again met its $700,000 Combined Federal Campaign goal -- and exceeded it by more than $10,000.

***Image right: As part of CFC Community Service Days, Marshall Center team members paint a room at the Harris Home for Children. (NASA/MSFC/Fred Deaton)***

The center's workforce raised $710,458 for the annual campaign by the Dec. 15 deadline, and contributions are still rolling in. "I'm proud of the Marshall team," said Patrick Rasco, chairman for Marshall's CFC campaign. "The Marshall

community responded with a clear desire and commitment to help, and went above and beyond the center's goal. Local charities need our support, and the funds that Marshall team members contributed will be put to great use."


The reigning Miss Alabama, Anna Laura Bryan, two soldiers from the Wounded Warrior Project -- which raises awareness and provides services to injured military service members -- and Marshall Center Director Patrick Scheuermann officially kicked off the campaign Oct. 1 at a rally in Building 4316.

***Image left: The reigning Miss Alabama, Anna Laura Bryan, spoke to CFC rally goers about the importance of giving, and about autism awareness -- her pageant platform -- at the CFC kickoff rally. (NASA/MSFC/Emmett Given)***

Since that kickoff, hundreds of Marshall team members supported more than 15 Community Service Days activities, volunteering their time to serving meals, cheering on athletes at the Special Olympics, building wheelchair ramps and assembling bikes for disabled children.

About 200 Marshall team members also participated in nine bus tours to get a glimpse of how their CFC contributions help participating charitable organizations, including the National Children's Advocacy Center and the Care Assurance System for the Aging and Homebound, or CASA.

***Image right: During a CFC bus tour, Marshall Center team members hear how CFC contributions benefit the Land Trust of North Alabama. (NASA/MSFC/Fred Deaton)***

The Marshall Center's CFC effort is part of the Tennessee Valley Combined Federal Campaign -- a joint effort that also includes the Army's Aviation and Missile Command and other federal agencies at Redstone Arsenal and in surrounding Alabama and Tennessee counties. Marshall's donations went toward the Tennessee Valley-wide organization's goal of $2.5 million.

*Davidson, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.*

› Back to Top

---

**It's 'Jeopardy' for Marshall's Kristin Morgan Jan. 9**
*By Rick Smith*

Here's your question: Name a mother who would ponder her daughter's career -- as a full-time NASA engineer-turned-strategic analyst supporting NASA's Marshall Space Flight Center -- and still dream of something more for her?

***Image left: Marshall Strategic Analyst Kristin Morgan. (NASA/MSFC/Emmett Given)***

Answer: Who is Kristin Morgan's mother?

Morgan is kidding. But on Jan. 9, 2013, she finally will achieve a goal her mom has spoken of for years. She'll appear on the television quiz show "Jeopardy."

She fondly recalls watching the show with her mom throughout her youth. "When I was in high school, my mother would tell me to try out for the 'Teen Week' show," she said. "When I was in college, she'd say, 'Why don't you try out for the college championship week?'"

She laughed. "I finally made it. Mom's pretty excited."

Morgan's episode of "Jeopardy" will air on Huntsville's WAAY-TV. Check local listings for broadcast times.

**'Let's Play Our Game'**

Every year, for a window of time as brief as one week, "Jeopardy" producers post an online test for adult contestants. The test Morgan took included 50 questions in 50 different categories. There was an 8-second time limit per question -- a clever way to keep would-be participants from turning to Google for help.

Morgan did well enough on that online quiz (after three attempts, she admits) to be invited to a second audition in New Orleans. She went in August, along with a handful of other Huntsville-based hopefuls and a camera crew from WAAY-TV. There, she took the test again and chatted with production team members, as they assessed candidates' potential.

The result of that second hurdle? Morgan was entered into a national contestant pool. People in the pool might get a call any time in the next 18 months -- or they might never hear from "Jeopardy" again. Some 100,000 people take the online test, she was told. Of those, about 4,000 are invited to regional tryouts. As few as 400 actually get called to appear on the show.

For Morgan, the call arrived just a few weeks later. She flew to Los Angeles Oct. 14; the taping was conducted at Sony Pictures Studios in Culver City, Calif.

"Jeopardy," now entering its 29th season of television syndication, tapes two days a week, five episodes per day. Morgan found the production fun and fascinating.

"We visited the studio set and practiced with the buzzer," she said, referring to the handheld device contestants use to ring in to answer one of the show's famously inverted questions. "The producers were great. They want everyone to be comfortable and do their best."

She remains mum about the outcome, of course; friends, family and coworkers will have to tune in to see how Morgan fared under the rapid-fire questioning of "Jeopardy" host Alex Trebek.

**'Let's Learn More About Our Contestant'**

Morgan, as Trebek might say in his introduction, lives in Huntsville with her husband Kevin and two dogs. She holds undergraduate and master's degrees in materials engineering -- earned in 2000 and 2002, respectively -- from the University of Florida in Gainesville. But her "Jeopardy" secret weapon, she said, may have been the semesters she spent as an art history major before switching career tracks.

After college, she went to work for Lockheed Martin at the Michoud Assembly Facility, conducting materials testing and analysis of the protective foam sprayed on the space shuttle external tanks. She joined NASA in 2007, initially serving as a materials engineer in Marshall's Materials & Processes Laboratory.

Since 2010, she has worked for the Office of Strategic Analysis & Communications, helping Marshall leaders assess long-term business strategies to best position the center to meet future national needs in launch vehicles, space systems, engineering and science. She enjoys her job -- and appreciates the coworkers who arranged mock-"Jeopardy" competitions in their spare time to help her prepare for the show.

She still spars with them occasionally, she said, over challenging questions of literature, geography and history. And still adorning her desk -- part lucky charm, part handy tool for maintaining order in a bustling office -- is her practice "clicker," the stand-in for the "Jeopardy" buzzer.

On Jan. 9, we'll see how she handles the real thing.

*Smith, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.*

› Back to Top

---

**SLS Progressing Toward First Launch of Orion Spacecraft**

*Employees at NASA's Marshall Space Flight Center unpack four large metal rings that will be used to create adapters for the Orion spacecraft to integrate with the propulsion elements for flight. The rings were forged at Major Tool and Machine in Indianapolis, Ind., for NASA's Space Launch System Program, managed at the Marshall Center. (NASA/MSFC/Ray Downward)*

*Michael Hale, a quality assurance inspector with the Space Systems Department at the Marshall Center, takes a closer look at the set of metal rings recently delivered to Marshall. Two of the rings will be part of an adapter integrating the Orion spacecraft to a Delta IV rocket for a test flight in 2014, and the other two will be part of a ground test adapter for the Space Launch System. (NASA/MSFC/Ray Downward)*

› Back to Top

---

**'Beating Heart' of J-2X Engine Finishes a Year of Successful Tests**
*By Bill Hubscher*
*from NASA news release*

NASA took another step toward human exploration of new destinations in the solar system on Dec. 13. At NASA's Stennis Space Center, engineers conducted the final test-firing of the J-2X powerpack assembly, an important component of America's next heavy-lift rocket.

***Image right: The J-2X powerpack assembly was fired up one last time on Dec. 13 at NASA's Stennis Space Center, finishing a year of testing on an important component of America's next heavy-lift rocket. (NASA/SSC)***

The J-2X engine is the first human-rated liquid oxygen and liquid hydrogen engine developed in the United States in decades. Designed and built by NASA and industry partner Pratt & Whitney Rocketdyne of Canoga Park, Calif., the engine will power the upper stage of NASA's 143-ton (130-metric-ton) Space Launch System (SLS) rocket, managed at NASA's Marshall Space Flight Center. The powerpack is a system of components on top of the engine that feeds propellants to the bell nozzle of the engine to produce thrust.

"The determination and focus by teams at the Marshall and Stennis centers on designing and perfecting the J-2X engine helps show the great strides of progress made on the overall program," said SLS Program Manager Todd May. "We are inspired to stay the course and pursue our goal of exploring deep space and traveling farther than ever before."

The powerpack was worked out separately from the engine to more thoroughly test its limits. It also can be operated under a wider range of conditions. The tests provide a trove of data to compare with analytical predictions of the performance of

several parts in the turbopump and flexible ducts.

"These tests at Stennis are similar to doctor-ordered treadmill tests for a person's heart," said Tom Byrd, J-2X engine lead in the SLS Liquid Engines Office at the Marshall Center. "The engineers who designed and analyze the turbopumps inside the powerpack are like our doctors, using sensors installed in the assembly to monitor the run over a wide range of stressful conditions. We ran the assembly tests this year for far longer than the engine will run during a mission to space, and acquired a lot of valuable information that will help us improve the development of the J-2X engine."

The powerpack assembly burned millions of pounds of propellants during a series of 13 tests totaling more than an hour and a half in 2012. The testing team set several records for hot-firing duration at Stennis test stands during the summer. NASA engineers will remove the assembly from the test stand to focus on tests of the fully integrated engine. Installation on a test stand at Stennis will begin in 2013.

The SLS will launch NASA's Orion spacecraft and other payloads from the agency's Kennedy Space Center in Florida, providing an entirely new capability for human exploration beyond low Earth orbit.

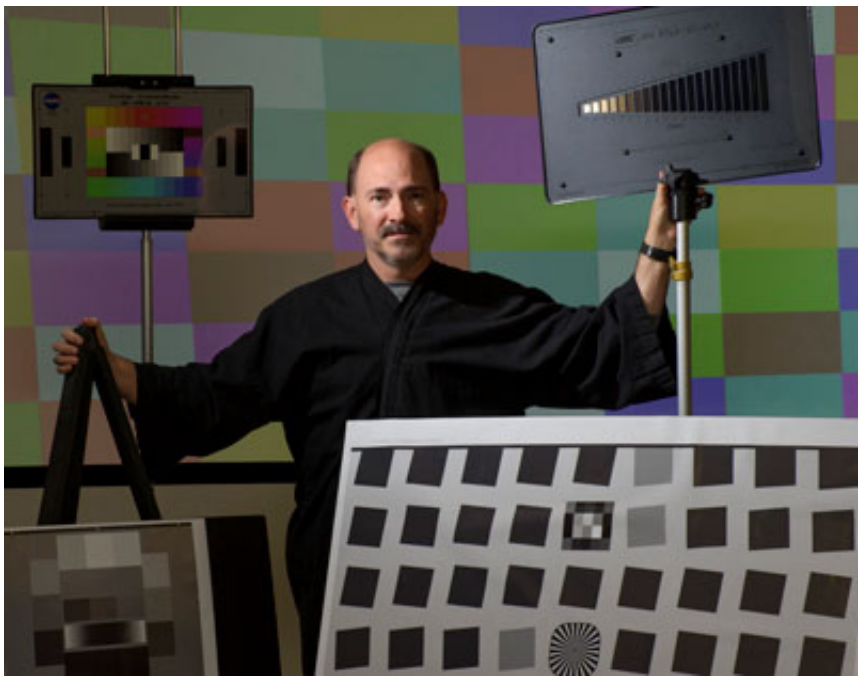
*Hubscher, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.*

› Back to Top

---

**The Face of Mission Success at Marshall is:**
**Rodney Grubbs**
**Program manager of the Imagery Experts Program**

***Image right: Rodney Grubbs (NASA/MSFC/Emmett Given)***



- **Organization:** Engineering Directorate at NASA's Marshall Space Flight Center
- **Years at Marshall:** 25 years
- **Education:** Bachelor's degree in film and broadcasting, University of Alabama in Huntsville, 1988
- **Responsibilities:** I am the program manager for the NASA Imagery Experts Program, which includes the NASA Digital Television Working Group, the NASA Web Video Working Group and the NASA Still Imagery Working Group. We are responsible for the technical operation and maintenance of the NASA TV system. We set standards and provide best practices for acquisition, production and distribution of video for the agency. I am also a principal investigator for a 3D high-definition TV camera on the International Space Station. We provide technical expertise to a variety of programs and projects across the agency. Recent examples include the upgrade of the video system on the station, imagery support to NASA's Space Launch System Program, an upgrade to the video system on the Microgravity Science Glovebox and a new project to place HDTV cameras on the exterior of the station. We support these programs with test and verification of hardware, requirements reviews, design reviews and other support as requested. I also chair an international group, the Motion Imagery & Applications Working Group, which is chartered by the Consultative Committee for Space Data Standards. We are writing an interoperability standard for video-in-space applications such as spacecraft, Extravehicular Activity helmet cameras and remotely operated video systems. I am

also currently Marshall's lead for Delay Tolerant Networking, which is designed to operate effectively over extreme distances. The center is involved in supporting the development of emerging delay or disruption tolerant networking protocols as well as infusing these technologies into use on the space station.

- **Have you found any unique, cost-saving or collaborative processes or innovations in the last year?** Probably the most significant one has to do with the public's access to NASA imagery. We had an agreement with the nonprofit organization Internet Archive that consolidated the 13 publicly available NASA imagery websites into one NASA images site. When the arrangement expired this summer, the Internet Archive and NASA were not interested in continuing the agreement for a variety of reasons. I negotiated with the Defense Video & Imagery Distribution System management team to host the NASA images site for only $7,000 a year. Their site is very well constructed and using it keeps NASA from having to spend a lot of time and money.
- **What do you hope to accomplish in your role this year?** Today when you look at the built-in schedule for NASA TV on your satellite or cable TV provider, it simply shows the block of programming that is on, such as "ISS Programming." We are working with Headquarters to make the schedule much more detailed, as you see for other TV channels, where the name of the program is listed with a description. We hope to have links from the online schedule to a video-on-demand version of the program that can be downlinked and viewed on a computer or mobile device. We are also working with the Office of the Chief Information Officer to expand the agency's capabilities to transfer large data files within the NASA network. Centers currently use an aging file transfer system to send large video files between centers. Finally, we're hopeful we can begin to establish a permanent Delay Tolerant Networking capability for payloads on the station.
- **Do you partner outside your org/outside Marshall on your work? What, in your mind, exemplifies Marshall's value as a business partner?** Everything I do involves collaborations. I lead agency working groups that have members from every NASA center. I work with industry on projects and help fulfill requests from filmmakers looking for footage. I lead working groups that include members from several international space agencies. We are working with the Japanese Aerospace Exploration Agency on a project to demonstrate Delay Tolerant Networking over their space station satellite system. Marshall is known as a place with highly competent employees that have good engineering experience and project management success.
- **Who is someone you admire and why?** I admired Steve Jobs, co-creator of Apple Inc. Though he was not an engineer or computer scientist, he managed to create a company that has risen to be one the most valuable companies on Earth, responsible for creating entirely new industries and very innovative products. I admire how he bridged art and technology. My degree was in the arts, but my career has evolved to where I am a technologist enabling new and compelling content to be available for others to use. I'd like to be able to bridge the arts and technology in a similar way at NASA.

› Back to Top

---

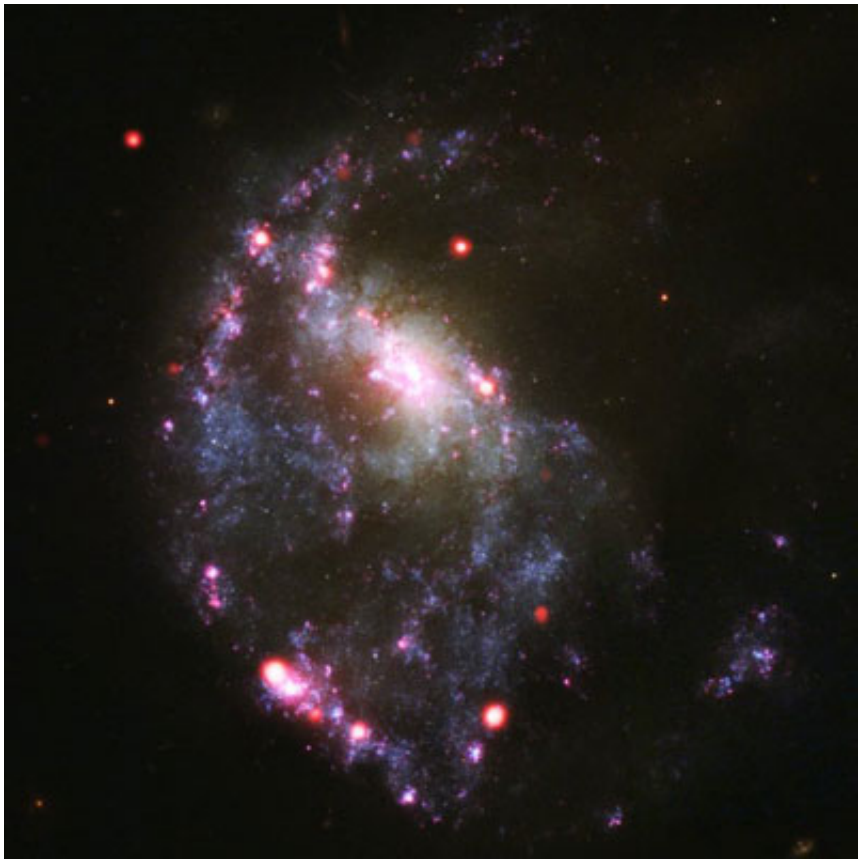
**Marshall Center Director Gives Commencement Speech at Alma Mater**

*NASA's Marshall Space Flight Center Director Patrick Scheuermann gives the fall 2012 commencement speech Dec. 15 at the University of New Orleans. Scheuermann is a native of New Orleans and received a bachelor's degree in mechanical engineering in 1986 from the university. (Photo courtesy)*

› Back to Top

---

**Searching for the Best Black Hole Recipe**



*In this holiday season of home cooking and carefully honed recipes, some astronomers are asking: What is the best mix of ingredients for stars to make the largest number of plump black holes?*

*They are tackling this problem by studying the number of black holes in galaxies with different compositions. One of these galaxies, the ring galaxy NGC 922, is seen in this composite image containing X-rays from NASA's Chandra X-ray Observatory, shown in red, and optical data from the Hubble Space Telescope, shown in pink, yellow and blue. NGC 922 was formed by the collision between two galaxies -- one seen in this image and another located outside the field of view. This collision triggered the formation of new stars in the shape of a ring. Some of these were massive stars that evolved and collapsed to form black holes.*

*Most of the bright X-ray sources in Chandra's image of NGC 922 are black holes pulling material in from the winds of massive companion stars. Seven of these are what astronomers classify as ultraluminous X-ray sources, or ULXs. These are thought to contain stellar-mass black holes that are at least 10 times more massive than the sun, which places them in the upper range for this class of black hole.*

*Theoretical work suggests that the most massive stellar-mass black holes should form in environments containing a small fraction of elements, or "metals", heavier than hydrogen and helium. In massive stars, the processes that drive matter away*

*from the stars in stellar winds work less efficiently if the fraction of metals is smaller. Thus, stars with fewer of these metals among their ingredients should lose less of their mass through winds as they evolve. A consequence of this reduced mass loss is that a larger proportion of massive stars will collapse to form black holes when their nuclear fuel is exhausted. This theory appeared to be supported by the detection of 12 ULXs in the Cartwheel galaxy, where stars typically contain only about 30 percent of the metals found in the sun.*

*To test this theory, scientists studied NGC 922, which contains about the same fraction of metals as the sun, meaning that this galaxy is about three times richer in metals than the Cartwheel galaxy. Surprisingly, the number of ULXs found in NGC 922 is comparable to the number seen in the Cartwheel galaxy. Rather, the ULX tally appears to depend only on the rate at which stars are forming in the two galaxies, not on the fraction of metals they contain.*

*One explanation for these results is that the theory predicting the most massive stellar-mass black holes should form in metal poor conditions is incorrect. Another explanation is that the metal fraction in the Cartwheel galaxy is not low enough to have a clear effect on the production of unusually massive stellar-mass black holes, and therefore will not cause an enhancement in the number of ULXs. Recent models incorporating the evolution of stars suggest that a clear enhancement in the number of ULXs might only be seen when the metal fraction falls below about 15 percent of the sun's value. Astronomers are investigating this possibility by observing galaxies with extremely low metal fractions using Chandra. The number of ULXs is being compared with the number found in galaxies with higher metal content. The results of this work will be published in a future paper.*

*A paper describing the results for NGC 922 was published in the March 10 issue of the Astrophysical Journal. NASA's Marshall Space Flight Center manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass. (Credits: X-ray: NASA/CXC/SAO/A. Optical: NASA/STScI)*

› Back to Top

---

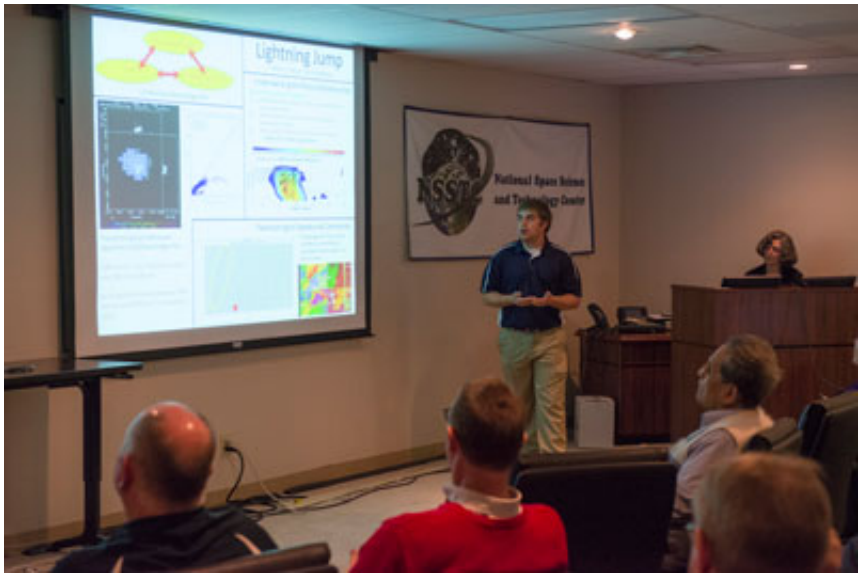
**Marshall Center Director Speaks at the National Space Club's Huntsville Chapter Breakfast**


*NASA's Marshall Space Flight Center Director Patrick Scheuermann addresses the Huntsville chapter of the National Space Club at the second-annual Membership Appreciation Breakfast on Dec. 12. Scheuermann highlighted innovative technology and processes implemented on several projects, including NASA's Space Launch System, the James Webb Space Telescope, the International Space Station and various science missions conducted by the Marshall Center. The Space Club event was held at the U.S. Space & Rocket Center's Davidson Center for Space Exploration. (Image: Donnie Claxton)*

› Back to Top

---

**Sixth Annual Science & Technology Jamboree Held Nov. 30 at the National Space Science & Technology Center**




*Chris Schultz, a NASA cooperative education student in the Science & Technology Office, presents his work Nov. 30 during the sixth annual Science & Technology Jamboree about how the total lightning jump algorithm will be placed in the Geostationary Operational Environmental Satellite-R Series Geostationary Lightning Mapper data stream. This algorithm detects rapid increases in the total flash rates within thunderstorms. The increases, called lightning jumps, have been correlated with the occurrence of severe weather several minutes after a jump has occurred. The goal of this algorithm is to provide weather forecasters an additional tool for severe weather detection. At the Science & Technology Jamboree, held at the National Space Science & Technology Center, team members share their science work with NASA's Marshall Space Flight Center community. (NASA/MSFC/Fred Deaton)*

› Back to Top

---

**Volunteers Needed for Human Factors Research Opportunity**

Volunteers are being sought to participate in a series of human factors ergonomic test sessions that simulate pre-launch ground operations using virtual avatars and motion capture technology. This will support a database of example motions to be used by worksite designers for NASA's Space Launch System and future launch vehicle programs.

To participate, test subjects must be civil servants who can obtain management approval. Preferred physical attributes for test subjects are a height of 5 feet or less for females and 6 feet 1 inch or more for males. Sessions last approximately three hours and include: measuring test subjects, configuring reflective joint markers, and capturing task sequences with digital video and motion capture cameras.

Sessions are being conducted during December 2012 and early January 2013. This study has been approved by the Institutional Review Board and appropriate precautions will be taken to protect the identity of subjects.

Those interested in participating should contact Jason Quick no later than Jan. 4. Quick can be contacted at 256-961-1368, 651-587-3986 (cell), or jason.c.quick@nasa.gov.

› Back to Top

---

**Marshall's Cooke Soothes Texans' Fears Over Bright Fireball**

On Dec. 7 at 6:43 a.m., eyewitnesses across Texas and adjacent states saw a very bright fireball streaking across the sky, moving roughly east to west. It was also recorded by a NASA meteor camera in Mayhill, N.M., some 500 miles to the west, which is very unusual and testifies to the brightness of the event.

"This was not the re-entry of Kosmos 2251, which was destroyed in a collision with an Iridium satellite in February 2009; it is a meteor, most likely a fragment from the asteroid belt and not associated with the Geminid meteor shower," said Bill Cooke, lead of Meteroid Environment Office at Marshall.

Preliminary results indicate that there are meteorites from this meteor on the ground north of Houston, Texas -- analysis is

currently under way to refine the impact area. If pieces are recovered, it will be the 13th meteorite fall recorded in the state since 1909, and the first since Ash Creek, which fell in February 2009.

A video of the fireball, as recorded by the NASA camera in New Mexico, was broadcast by NBC Nightly News.


To view this video, visit NASA's video gallery at http://www.nasa.gov/multimedia/videogallery/index.html?media_id=156675151

*The moon is the bright object at lower center; the fireball is on the horizon at left and is surrounded by a white box when the camera detects it. Up is north, and left is east in the video.*

› Back to Top

---

**Marshall Center Hosts Holiday Reception**

*NASA Marshall Space Flight Center team members are entertained by pianist Christopher-Joel Carter, left, and vocalist Jennifer Simmons, a Marshall education program specialist, right, at the center's holiday reception Dec. 13 in the Activities Building 4316. Employees also enjoyed a wide selection of snacks, heavy hors d'oeuvres and gourmet chocolates. Door prizes, including gift cards of $50 to $300, were given to several lucky winners. (NASA/MSFC/Emmett Given)*

› Back to Top

**Marshall Star to Take Break for Holiday Season; Resumes Jan. 9 with Special 2012 Year in Review**

This will be the last issue of the Marshall Star for 2012. The Star, published 50 times each year, will not publish for two weeks during the holiday season.

Publication will resume Jan. 9, 2013, with a special Year in Review, highlighting the 2012 accomplishments of NASA's Marshall Space Flight Center. Visit http://www.nasa.gov/centers/marshall/about/star/ at 2 p.m. for the new edition.

› Back to Top

**Obituaries**

**Elwood Oliver**, 81, of Huntsville died Nov. 13. He retired from the Marshall Center in 1989 as a supervisory contract specialist.

**Leroy Aderholt**, 82, of Athens died Nov. 18. He retired from the Marshall Center in 1985 as an employee relations specialist.

**Jerry Huffman**, 79, of Huntsville died Nov. 22. He retired from the Marshall Center in 1988 as a computer systems analyst. He is survived by his wife, Juanita Huffman.

**John Gillilan**, 77, of Guntersville died Nov. 22. He retired from the Marshall Center in 1986 as a program analyst.

**Lyndon Trigg Stone**, 91, of Fayetteville died Nov. 27. He retired from the Marshall Center in 1994 as a computer specialist. He is survived by his wife, Corinne Redd Stone.

**Wilbert Gover**, 79, of Huntsville died Nov. 30. He retired from the Marshall Center in 1999 as a data systems engineer. He is survived by his wife, Kay Gover.

**William E. "Bill" Galloway**, 70, of Tallassee died Dec. 17. He retired from the Marshall Center in 2000 as a flight systems engineer. He is survived by his wife, Becky Galloway.

**Find this article at:**

http://www.nasa.gov/centers/marshall/about/star/index.html